

Preparing Technology-Based Teachers: Lessons from a K-12/University Collaborative

Claire Smith Hornung
Technology-Based Teacher Education Program
Lehigh University
111 Research Drive
Bethlehem, PA USA 18015
(610) 758-3268
clh6@lehigh.edu

Stephen C. Bronack, Ph.D.
Technology-Based Teacher Education Program
Lehigh University
111 Research Drive
Bethlehem, PA USA 18015
(610) 758-3240
bronack@lehigh.edu

Abstract: The integration of technology throughout the curriculum of both K-12 schools and higher education is widespread throughout America. There are over 1.6 million computers in American schools today (Rosenthal 1999). Millions of dollars are being spent on educational technology (Bull, Nonis, & Becker, 1997), as educators strive to establish a reasonable ratio of computers to students--some (Smith, 1999) suggesting as little as one-to-four, respectively. The preservice teachers enrolled in the Technology-Based Teacher Education program at Lehigh University partner with experienced inservice teachers for a semester to work towards the educational goal of integrating technology into an established curriculum. Preliminary analysis of survey and interview data suggests the partnership may accelerate the professional development of new teachers and provide a support structure for experienced teachers who are beginning the integration process. Both inservice and preservice participants expressed perceived benefits from the project.

The systematic introduction of technology into classrooms has become an increasingly important school reform issue since the 1980's. Recently, the integration of technology into established school curricula of both preservice and inservice teachers has emerged as a focus for colleges of education and K-12 schools. Understanding the role of technology integration within K-12 classrooms is vital to the professional growth of both novice and experienced teachers. Technology resources are requiring educators to rethink how they teach. Educators must focus on integrating technology into the school day: using technology to communicate, to think and to learn (Dwyer, 1996).

Technology as a Tool

Technology--particularly, computer-based applications and software--is emerging as a viable instructional tool for many inservice teachers (Conte, 1998). However, some educators simply have not adopted technology as a tool to use in their curriculum. Lack of comprehensive training is the number one reason why teachers are not using technology in their classrooms (Sykes 1997). Insufficient time and non-existent or inappropriate incentives hinder teacher inservice work (Smith, 1999). If educators are to recognize technology as useful for effective teaching, then staff development should begin with the establishment of underlying philosophies and goals for the use of this technology. Curriculum orientations should guide the goals on how technology should be used. Once a philosophy has been adopted, then the inservice teacher needs relevant and ongoing instructional support (Bull, Nonis, & Becker 1997). On-going staff support and encouragement is key to teachers use of technology in their curriculum (Conte, 1998). Sometimes teachers are unaware of what technologies are available in their schools, or of how to

take advantage of them when they obtain them. Therefore, when a teacher is willing to give technology a try having onsite support is key. Teachers who come across problems while teaching with a technology, and have support, are more willing to keep trying. Sadly, the opposite is true. Teachers lacking support and encouragement will more likely give up a technology enriched lesson when it goes awry (Conte, 1998). Schools must devise strategies for strengthening capacity within their own ranks in order to sustain their efforts and continue to grow (Maddin, 1997).

Preservice Teacher Education

Our preservice teachers must be skilled and supported in using technology, as well. Presently, thirty-eight states have technology requirements for teacher preparation programs (Rosenthal, 1999). Studies document that preservice teacher technology education has not kept pace with the changes that have affected the quality and quantity of technologies (Anonymous, 1999). Many preservice teachers find that the experience of using a computer is lacking for practical purposes (Laffey & Musser, 1998). Schools of education often overlook the very basic needs of their preservice teachers. According to Rosenthal (1999) only two of the thirty-eight education programs require actual evidence of proficiency in the use of technology in teaching for certification. Through her research Rosenthal (1999) presented several areas in teacher preparation programs that lacked initiative to fulfill these requirements. For instance, many teacher education programs lack the hardware and software necessary to incorporate technology into the teaching agenda.

Some education faculties have not been provided the training they need to use technology effectively. Other higher education faculties have little understanding of the changes technology is bringing to the K-12 classrooms and have not adjusted their own teaching methodologies to reflect these changes. This lack of modeling to preservice teachers provides little support of the use of technology to enhance teaching (Anonymous, 1999). According to a recent study conducted at the University of Michigan several factors deter the growth of preservice teacher education programs. For example, a lack of a written, funded and updated program will ensure little future growth. Finally, many preservice teachers who work in schools for field experiences do not typically work with master teachers who can provide them with support and information on the use of technology.

Technology-Based Teacher Education Program

The Technology-Based Teacher Education (TBTE) Program at Lehigh University is addressing this need of preparing teachers with the belief that modern technologies can and should be used as an educational tool. The TBTE program weaves technology throughout the course work and experiences of the preservice teacher. This ensures that the preservice teacher has a broad and meaningful understanding of how technology, teaching and learning interact. It is the programs belief that technologies--such as computers and the Internet-- are more likely to succeed when their use addresses actual needs, encourages the development of a professional community and is grounded in sound theoretical understandings (Nonis, Bronack & Heaton 1998). One area that TBTE stresses with its preservice teachers is field-based experiences. Preservice teachers enrolled in the Seminar in Elementary and Secondary Education regularly work in classrooms with inservice teachers. In addition to working with an inservice teacher, these preservice teachers are actively observing experienced, model teachers.

Seminar in Elementary and Secondary Education

The Seminar in Elementary and Secondary Education course is designed to be the first course preservice teachers take as they begin the 5-year BA/MEd teacher education program at Lehigh University. The course outline touches on several basic elements of teaching, both from the historical model and the present day perspectives. The discussion-based format allows students to share their ideas, interests and concerns regarding education today as they plan to become our future teachers. In addition to the discussions and weekly readings that are assigned to each student, the last hour of each class is spent in a "Tech Talk." Tech Talks range from learning about email and word processing documents, to databases and digital cameras. Each student is responsible for demonstrating competency in using that specific technology by the end of the course. The objective of the Tech Talk is to introduce to these preservice teachers the varied technologies, both hardware and software, available to them as future educators. This knowledge base also assists them in their field experience work via the Lehigh/Moravian Partnership.

The Lehigh/Moravian Partnership

The students enrolled in the Seminar in Elementary and Secondary Education course at Lehigh form a partnership with Moravian Academy--a K-12 Independent School--to address the needs of both preservice and inservice teachers. The partnership provides a variety of opportunities for both the preservice and inservice teachers. First, the preservice teacher spends quality time observing, interacting and conversing with an experienced

educator. The preservice teachers use a Web-based journal form on the course website to share their reflections with the course instructors via field notes for each visit to their classroom. These notes asked the individual students to reflect on the topics discussed, technologies explored, and ideas generated. The field notes allow the preservice teachers to contemplate, reflect, and share concerns about their experience and serve as an on-going update for the instructors on the progress of each preservice-inservice dyad. Second, the preservice teacher work in an environment where technology is available throughout the school. The preservice teacher has an opportunity to see how technology is used in an actual classroom setting. Third, the partnership experience provides an opportunity for inservice and preservice teachers to collaborate on technology integration within an existing curriculum to solve real educational problems. Through conversation, observation and experience the inservice teacher learns more about new technologies and techniques available for teaching.

The Lehigh/Moravian Partnership is overseen by a faculty member at the university and administrators from Moravian Academy and is coordinated by a doctoral student who is a former teacher at Moravian Academy. The coordinator decides on placements for each team and meets with both the preservice and the inservice teachers when necessary. Placement depends on the academic interest and grade level that most interests the preservice teachers. Schedules of both the preservice and inservice teachers are considered, as well. Each semester begins with a gathering of both groups for introductions and orientation to the project. The preservice teachers spend a minimum of 20 hours observing and working with their mentor teachers. The objective for the preservice teachers is to observe and work with an experienced educator. The preservice and inservice teachers decide together upon an area of the established curriculum where technology can be embedded to enhance the learning experiences of the students in the class. The preservice teacher is then responsible for researching and finding appropriate technologies to address the stated needs.

Toward the end of the semester, each preservice teacher is responsible for developing and delivering a final project. The project involves teaching a technology-rich lesson to the students--in partnership with the inservice teacher. The projects vary. Some use the digital camera to incorporate photos into writing samples and slideshows. Others use a specific piece of software--such as Hyperstudio or Powerpoint--to complement a part of the existing curriculum. The inservice teachers provide informal feedback to the students during the presentation. At the end of the semester, each inservice partner provides more formal feedback to their preservice intern through a course evaluation. Finally, the preservice teachers present an overview of their lesson to their peers during their Seminar class. Included in their overview presentation is a written description of the lesson and example of the project.

Formal Evaluation

Data from the first partnership cohort was collected at the end of the Spring 1999 semester from both the preservice and the inservice participants via a 12-item end-of-course survey. Each participant was asked to respond to the Lehigh/Moravian Partnership Feedback Form, a five-point Likert scale questionnaire concerning issues of guidance, structure, professionalism, and benefit of the program. Results in each category are displayed in Table 1, below:

Factor	Preservice (N=19)	Inservice (N=15)	F
	Mean (SD)	Mean (SD)	
Guidance	3.91(.86)	3.86(.48)	4.86
Structure	3.92(.90)	3.76(.77)	0.50
Professionalism	4.40(.71)	4.66(.53)	2.39
Perceived benefit	4.36(.60)	4.48(.74)	0.20

p < .01

Table 1: Results of End of Course Survey--Preservice and Inservice Participants

An independent t-test was conducted to investigate differences between the inservice and preservice participants with regard to the four factors. No significant differences were found between groups ($p < .01$). It is important to note that, given the small number of participants and the exploratory nature of this initial study, the results of the t-test must be viewed as prefatory.

Further data gathering is in process as the partnership continues to develop. In Fall 1999, a second cohort of inservice/preservice dyads was begun. The inservice and preservice teachers were asked to respond to the

Technology Teacher Survey once at the beginning of the semester and again at the end. Sample statements for this survey were divided into several categories: technology skill and knowledge, enthusiasm regarding technology, challenges implementing technology and confidence using technology. This survey targets the overall use of technology in the classroom. The data from this survey will add further to our growing understanding of the impact and effectiveness of the Lehigh/Moravian partnership.

Conclusion

The goals of the Seminar in Elementary and Secondary Education course and the Lehigh University/Moravian Academy Partnership includes the development of techniques that help emerging teachers close the gap between the potential of technology and its realization by teachers in their own classrooms. Certainly the experiences of both the preservice and the inservice teachers varied depending on the match made between the two and the expectations that each group had going into the partnership. Generally speaking, however, each pair succeeded with the overall objective: integrating a new piece of technology into an established curriculum. Some had more success than others with the working partnership created within each team. The field notes provide an outlet for the preservice teachers to express concerns. The inservice teachers used meeting time and emails to communicate concerns or problems.

Several modifications arising from what we have learned from the first cohort have already been initiated in the second group. For example, a more formal email system is now available for those inservice teachers involved to communicate with the coordinator on a more regular basis. Other suggestions made from the final evaluation by both the preservice and inservice have led to modifications in what technologies are covered and what initial skills are targeted as primary. By the end of the Spring 2000 semester, over 40 preservice teachers will have had the opportunity to work closely with experienced educators via the partnership. Many of the inservice teachers who took part in the partnership were only marginally facile with technology at the start. Yet, by the end of the course, all the inservice teachers had adopted some form of technology as a tool for both their own teaching and their students' learning. For most, this was a remarkable paradigm shift that will affect their practice to the ends of their careers.

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Claire Smith Hornung is a doctoral student in Curriculum and Instruction in the Technology-based Teacher Education Program, Lehigh University, Bethlehem, PA 18015. Voice, Office: 610-758-3268. Email: clh6@lehigh.edu.

Steve Bronack is assistant professor in the Technology-based Teacher Education and Educational Technology programs, Lehigh University, Bethlehem, PA 18015. Voice, Office: 610-758-3240. Email: bronack@lehigh.edu.

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